Kind ic Studies of the **Heterogeneous** Reaction of () + CO **Forming** CO_2 on **Oxide** and **Water Ice Surfaces: implications for the Atmospheric Stability** of Mars

The heterogeneous reaction of CO and O On the sur face of aerosols has been proposed as an important chemical process which may contribute to the CO_2 stability in the Martian atmosphere. The r eaction probabilities of the above-mcnticmcd process were measured on Pyrex, ice, and Fe_2O_3 surfaces at both 196 K and 295 K by using a fast flow-tube r eactor coupled to an electron-impact ionization mass spectrometer. The atomic oxygen was generated in a micr owave discharge of O_2/He and was allowed to react with CO inside the reactor. The concentrations of CO and O were measured to be in the ranges of (1 -5) x 1014 molecules cm^{-3} and (0.2-1,7) x 1014 atoms cm^{-3}, respectively. The reaction product, CO_2, was monitored mass spectrometrically by using its parent peak. The measured reaction probabilities were found to vary from 2 x 10-7 to 1.5 $x10^{-6}$ with little dependence on solid substrates, reactant concentrations, and temperatures. The observed CO_2 production rate arc about a factorof104 larger than that of the homogeneous () + CO- I M reaction. Wc arc also planning to investigate this reaction on the surface of the other inorganic oxides, such as Al_2O_3 and $Ti0_2$ Finally, implications of the present results for the Martian atmosphere will be discussed.